

Tier 2 Antidegradation Review

1. According to 30 TAC 307.5(b)(2), "No activities subject to regulatory action that would cause degradation of waters that exceed fishable/swimmable quality are allowed unless it can be shown to the commission's satisfaction that the lowering of water quality is necessary for important economic or social development." Additionally, in an Interoffice Memo from Lili Murphy, Standards Implementation Team to Municipal Permits Team (July 12, 2016) it was stated that, "no significant degradation of water quality is expected in Onion Creek, which has been identified as having high aquatic life uses." Based on the "high aquatic life uses" statement, TCEQ should require the City of Dripping Springs to conduct a review to show that the discharge is needed for important economic or social development. Has the permittee conducted an economic or social development review for this draft permit? If so, please provide. If not, please have the permittee conduct this review. This is especially important since it has been shown that the City of Dripping Springs has alternatives to discharging to Onion Creek (i.e., the current system of discharging via subsurface irrigation as well as future plans to expand the subsurface irrigation to other portions of the area (map in draft permit application)).

Answer: Per 307.5(c)(2)(F) An economic or social development review justifying the lowering of water quality is only necessary when degradation is anticipated. The Tier 2 antidegradation review states that water quality will not be lowered by greater than a *de Minimis* amount in those waterbodies that exceed fishable/swimmable quality. If water quality is decreased by greater than a *de Minimis* (less than noticeable) amount, then that would warrant an economic or social development review.

2. There is concern that the effluent limits proposed in the draft permit would contribute more than 450 pounds of phosphorus (P) per year in a phosphorus limited stream with a currently estimated annual load of approximately 1 pound of P annually. Additionally, the stream has a Total Nitrogen (N) load of 37 pounds per year and the proposed discharge would increase this to approximately 88,000 pounds of Total N annually (according to the letter from Protect Our Water, dated September 21, 2016). Please provide any information that shows that these increases would not negatively impact the receiving waters, or that they are incorrect.

Answer: A Tier 2 Antidegradation determination considers a noticeable decrease in water quality. Productivity in a stream naturally fluctuates throughout the year depending on flow, canopy, temperature, and season. Typically, organic matter such as leaves and dead vegetation falls into the stream, providing nutrients which can generate productivity as evidenced by the presence of algae. As a watershed develops, with the loss of riparian vegetation and increased impervious surfaces, it can further increase productivity in the stream due to loss of canopy provided by riparian vegetation and decreased filtration of pollutants typically provided by pervious surfaces that once existed in the watershed. If there are to be estimates of nutrient loading into Onion Creek, non-point sources of loading should also be addressed. The applicant is proposing a discharge permit in the interest of securing a Chapter 210 Reuse Authorization that would allow the irrigation of green spaces that is treated to a higher quality than a TLAP. A total phosphorus limit of 0.15 mg/L was recommended based on the existing concentrations present in the creek. It is anticipated that the loading could be considerably less with a Chapter 210 Authorization and discharges occurring only at high flow rates within the creek.

Tier 1 Antidegradation Review

3. According to 30 TAC 307.4(e), “Nutrients from permitted discharges or other controllable sources must not cause excessive growth of aquatic vegetation that impairs an existing, designated, presumed, or attainable use.” Onion Creek is presumed high aquatic life use and primary contact recreation and is used for recreational activities such as swimming, fishing, and boating. The increase in nutrients to the receiving waters will likely result in additional algal growth. Additionally, Tier 1 requirements state that surface waters must be maintained in an aesthetically attractive condition, and require that waste discharges not cause substantial and persistent changes from ambient conditions of turbidity or color (30 TAC 307.4(b)(4) and 30 TAC 307.4(b)(5)). Please provide appropriate information showing that the draft permit will not cause or contribute excessive nutrients to the receiving waters that would violate the above listed requirements of a Tier 1 antidegradation review.

Answer: Onion Creek is classified segment 1427 and it's designated uses are high aquatic life use with a 5.0 mg/L dissolved oxygen requirement, public water supply use, aquifer protection and primary contact recreation (Chapter 307, Appendix A). The Tier 1 Antidegradation review ensures that there will be no impairment of those uses. For primary contact recreation, a geometric mean of 126 *E. coli* per 100 ml is the limit used to protect the contact recreation use. If Onion Creek were to experience any additional algal growth, from the proposed discharge or non-point source pollution, it would most likely occur at lower flows and higher temperatures; which would be an opportunity for the applicant to irrigate landscapes with their treated effluent.

4. There is also concern with the values used in the QUAL-TX modelling. Specifically, for base flow, sediment oxygen demand (SOD), and chlorophyll-*a*.

BASE FLOW: The MOA between TCEQ and EPA, requires a value of 0.0 ft³/s to be used for intermittent streams (absent site-specific data) and a value of 0.1 ft³/s for perennial streams (absent site-specific data). The applicant used 0.3 cfs to represent critical low-flow.

SOD: The MOA requires a kinetic value of 0.35g/m²-day to be used. However, the applicant used 0.1 g/m²-day.

Chlorophyll-*a*: The MOA requires that chlorophyll-*a* should be set at 0.0 µg/L (absent site-specific data) in order to set the minimum levels. However, the applicant included a modeling run assuming a chlorophyll-*a* concentration of 2 µg/L. The modeling run predicted a dissolved oxygen (D.O.) value of 5.0 mg/L. This chlorophyll-*a* number seems inappropriate.

Please check that the appropriate values are used throughout the QUAL-TX modelling and provide appropriate information that can be reviewed by EPA. Also, re-run QUAL-TX modelling if the appropriate values were not used and provide the results.

Answer: The QUAL-TX modeling developed and submitted by the applicant's representatives included various aspects that were not consistent with the MOA between TCEQ and EPA and/or with TCEQ modeling SOPs, including assumed values for base flow, SOD, and chlorophyll-*a*. Consequently, these components of the QUAL-TX model were revised in the TCEQ version of the model, upon which the effluent limits (CBOD₅, ammonia-nitrogen, and minimum effluent DO) in the draft permit are based.

The base flow used in the TCEQ version of the QUAL-TX model is 0.1 cfs, the minimum value applicable for streams that are considered to be perennial. Available flow data for Onion Creek was investigated, but was found not to justify using a base flow higher than 0.1 cfs to represent critical low-flow conditions. Zero base flow is used in the model for intermittent Walnut Springs Creek.

The TCEQ version of the QUAL-TX model includes an SOD value of 0.35 g/m²-day for the advective reaches of the model, and SOD values at or above this rate for pooled reaches, based on 'no-load' model run results.

A chlorophyll-*a* value of 1 ug/L was used in the TCEQ version of the QUAL-TX model. This value is based on TCEQ Surface Water Quality Monitoring (SWQM) data, which indicated a median chlorophyll-*a* value of "less than 2 ug/L". TCEQ standard practice for dissolved oxygen modeling is to take a one-half-the-value approach when "less than" chlorophyll-*a* values are incorporated into median sample value calculations.

These changes, along with others, to make the modeling consistent with the MOA between TCEQ and EPA and with TCEQ modeling SOPs, have been incorporated into the TCEQ version of the Dripping Springs QUAL-TX model. This modeling analysis has been submitted to the EPA for review as a component of the July 2016 Update to the Texas Water Quality Management Plan (WQMP).